

REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1 to 18 with claims 17 and 18 being withdrawn from consideration.

The above amendment is responsive to the rejections under 35 U.S.C. 112.

With regard to the rejection of claims 3 to 11 on the ground that there is no antecedent basis for the term "said alkenyl group-containing compound", this has been changed to "unsaturated hydrocarbon" compound.

With regard to the rejection of claims 8 to 11 in that it is unclear how the term "a" molar number limits the claimed subject matter, such term has been changed to "the" molar number as in claim 7 which has not been rejected.

Such term is discussed at page 3, lines 12 to 16 of the present specification.

It is considered that all rejections under 35 U.S.C. 112 have been overcome by the above amendment.

Claims 1 to 16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. 6,562,934 (Yonehama et al.)

This rejection is respectfully traversed.

The modified polyoxyalkylene polyamine according to the present invention is obtained by addition reaction of a polyamine compound and an alkenyl group-containing compound. The starting polyamine compound used here is composed of polyoxyalkylene polyamine. Other polyamino compounds are not used with polyoxyalkylene polyamine in the present invention.

On the other hand, Yonehama discloses amino compounds obtained by addition reaction of a diamine component with an alkenyl compound. However, the diamine component disclosed in Yonehama is mainly composed of a diamine compound including ortho-xylylenediamine, meta-xylylenediamine, para-xylylenediamine, 1,2-bis(aminomethyl)cyclohexane, 1,3-bis(aminomethyl)cyclohexane, and 1,4-bis(aminomethyl)cyclohexane.

In Yonehama, polyoxyalkylene polyamine is merely disclosed as an example of other polyamino compounds to be employed with the diamine and the amount of said

other polyamino compounds to be employed with the diamine is preferably 1 part by weight or less per 1 part by weight of the diamine. See column 3, lines 55 to 65.

Applicants have conducted an experiment (additional comparative example) to demonstrate that the technical problem to be solved by the present invention cannot be solved when using more than 1 part by weight of other polyamino compounds per 1 part by weight of polyoxyalkylene polyamine as a starting polyamine. The method by which the experiment was conducted and the results are as follows:

(1) Additional Comparative Example

460.0g (2.0 mol) of polyoxypropylenediamine, manufactured by Huntsman Corporation, brand name: "JEFFAMINE D-230" (Molecular Weight: 230), having an active hydrogen equivalent weight of 60, 272.0 g (2.0 mol) of meta-xylylenediamine (molecular weight: 136) and 21.3g (0.93 mol) of lithium amide, a reagent manufactured by Merck Ltd., were charged to a 2 liter flask equipped with an agitator, a thermometer, a nitrogen gas inlet, a dropping funnel and a condenser. Then, its interior temperature was raised to 100°C in a nitrogen gas stream with stirring. Keeping the temperature at 100°C, 416.6g (4.0 mol) of styrene, a special grade reagent, manufactured by Wako Pure Chemical Industries, Ltd. in Japan was added thereto dropwise over 6 hours. After the completion of dropwise addition, its interior temperature was maintained to 100°C for 2 hours.

Then, after the reaction liquid was cooled to the room temperature, 167.7g (9.3 mol) of water as the amount of 10 times equal mol to the charged lithium amide was added thereto and stirred. After separating precipitates in the liquid in flask by filtration, remaining water was removed by vacuum distillation, whereby 1102.0g of the reaction product was obtained. The molar number of modification of the reaction product was 1.0 mole. The viscosity thereof was 25 mPa·s/25°C and the active hydrogen equivalent weight was 96.

An epoxy resin composition thus obtained was prepared by mixing bisphenol A type liquid epoxy resin with an epoxy equivalent weight of 190g/eq, manufactured by Japan Epoxy Resins Co., Ltd., brand name: Epicoat 828, and the above reaction product as a curing agent for the epoxy resin at a ratio shown in Table 1.

The epoxy resin composition thus obtained was cured under the conditions of 23°C and 50% RH to prepare an epoxy resin cured coating film, and the property of the coating film was evaluated. The evaluation (result) is shown in Table 1 along with the results of Examples 1 to 3 in the present specification.

(2) The method of evaluation:

An epoxy resin composition was coated on a steel plate with thickness of 200 μm at 23°C and 50% RH. The coated steel plates were cured for 7 days and then they were dipped in each chemical, i.e. sodium hydroxide with the concentration of 10% water, methanol and ethanol, for 7 days at 23°C. Changes of the appearance of the coating films were observed visually to evaluate chemical resistance.

The result of the evaluation was shown based on the following 4 stages of criteria:

◎ : Excellent; ○ : good; △ : fair; X: poor

(3) The results:

Table 1

	Example 1	Example 2	Example 3	Additional Comparative Example
Epoxy resin composition (g)				
Epicoat 828	100	100	100	
Modified Polyoxypropylenediamine	60			
Modified Polyoxyethylenediamine B		45		
Modified Polyoxyethylenediamine C			67	
				51
Property of a cured coating film				
Chemical resistance				
10% Sodium hydroxide	◎	◎	◎	◎
Water	◎	◎	◎	◎
Methanol	◎	◎	◎	○
Ethanol	◎	◎	◎	○

As shown by the additional Comparative Example, the reaction product obtained by addition reaction of polyamine component comprising 50 wt% or more of other polyamino compound as a mixture is deteriorated in chemical resistance.

In the present invention, an excellent chemical resistance of an epoxy resin cured coating film can be achieved by the use of more than 50 wt% of polyoxyalkylene polyamine based on the total amount of a diamine component. Yonehama does not disclose or suggest the additional use of polyoxyalkylene polyamine of more than 1 part by weight per 1 part by weight of the diamine represented by the formula (1).

For the foregoing reasons, it is apparent that the rejection on Yonehama is untenable and should be withdrawn.

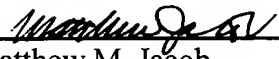
No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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